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AUTHOR Stack, Steven
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ABSTRACT

To analyze income inequality in 32 nations, the research tested hypotheses based upon eight socioeconomic variables. The first seven variables, often tested in income research, were: political participation, industrial development, population growth, educational level, inflation rate, economic growth, and technological complexity. The eighth variable, degree of socialism, had not been considered by previous major models of income inequality. It was hypothesized that less income inequality would exist in countries with higher levels of political participation, education, economic growth, and technological complexity; median levels of GNP per capita; lower levels of inflation; and a socialist economy. Data were obtained from the national statistical bureaus of the 32 nations and from the "United Nations Statistical Yearbook, 1973." Data were analyzed in three phases. The first phase considered the relationship of the first seven variables to income inequality. The second phase identified the effect of industrialization on income inequality. Only those nations with a level of development below the threshold where inequality increases despite high levels of industrialization were included in the analysis. The third phase entered the type of economic system (capitalist or socialist) into the regression analysis. Findings indicated that the first seven variables explained 59% of the variance in equality. The eighth variable, socialism, increased the explanatory power of the model to 71%. The conclusion is that future research on income inequality must consider degree of socialism as a major variable. (Author/DB)

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MULTIVARIATE ANALYSIS OF INCOME INEQUALITY, DATA FROM 32 NATIONS*

Dr. Steven Stack
Department of Sociology
Alma College
Alma, Michigan 48801

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The scientific study of income inequality has "come of age" in the last decade. Up to the mid 1960's the field of social stratification was largely concerned with the speculative and rather philosophic debate over the Davis and Moore (1945) functional theory of stratification. The publication of Cutright's (1967) empirical test of Lenski's theory of stratification, ushered in a renaissance of empirical investigation of stratification theory, symbolized by the contributions of Parkin (1971), Adelman and Morris (1973), Jackman (1974), (1975), and Rubinson (1976), to name only a few.

Many measures of political and economic factors have been found to have a significant bearing on the degree of income inequality in society.

The present paper will combine the salient features of the existing major models of income inequality and add several neglected variables to the analysis. Past models of income inequality have been built largely on Lenski's (1966) theoretical framework. They have emphasized the categories of the distribution of political power, surplus size, and technological level. I will include these categories in my model, but I will also add three others. First, the rate of inflation will be added in accordance with the theory of Galbraith (1958:264). Second, I will add the rate of population growth which was an important variable in Lenski's theoretical framework but has never been tested in the literature. Third, I will include the level of education as an index of the supply of <u>trained</u> manpower. The model will be tested with data from 32 nations.

A. THE DEPENDENT VARIABLE. In measuring inequality in the distribution of income one first must choose between at least two alternate units of distribution: the household or individual unit and the sectoral unit. In the former income is distributed to households or individuals. In the latter , income is distributed to selected sectors of the economy (agriculture, manufacturing, mining, and so on). There has been some debate over the meaningfulness of the sectoral operationalization of income inequality.

Writers such as Rubinson (1967:647), and Husbands and Money (1970) have questioned its validity. Measuring income inequality on the basis of dividing the value of the output of an industrial sector by the number of workers is conceptionally unsound since the numerator includes categories of income wuch as profit that do not go to the worker. Also, using sectoral income as one's measure assumes equal distribution of income to all workers in that sector. Husbands and Money, using data for eight nations showed that the relationship between the two measures of inequality was not statistically significant at the .05 level.

This is more than just a side issue because several major works use the sectoral measure of inequality (Cutright, 1967; Jackman, 1974, 1975). If the critics are right that sectoral income is an unreliable predictor of personal income distribution, then this would invalidate several of the widely regarded studies in the field.

The proponents of the sectoral measure argue that their measure of income inequality is a good and even an"ingenious" substitue measure of inequality given a shortage of comparable cross national data on household incomes. (Jackman, 1974; 1975; Cutright, 1970; Kuznets, 1963). Furthermore, they make reference to Kuznts' finding that the index of inequality based on sectoral income and the index based on household income data from the 48 American States are highly correlated (r= .82.)

We might be tempted to conclude that while there may be a strong relationship between sectoral and household income inequality for the 48 states, re .82; $p < .05$) it appears as though the use of the sectoral measure is a relatively poor predictor of household income inequality in cross national research where the relationship between the two is nonsignificant(Husbands and Money, 1970.)

Comparable data for 18 nations, however, yield a better correlation between the household income inequality meansure and sectoral income inequality measure (r= .718, Cutright, 1967; r= -.657, Jackman, 1975). The correlation matrix is given in Table 1. Hence, the Husbands and Money's (1970) criticism may have been a bit premature. If we look at 18 nations instead of just 8, the correlations improve and become significant.

Nevertheless, on the grounds of conceptual accuracy, despite these significant correlations, the present paper will follow the tradition of Rubinson (1976), Adelman and Morris (1973), and Paukert (1973) and use household income, not sectoral income, as the unit of distribution. However, given the above correlation, it appears as though Cutright (1967, 1970) and Kuznets (1963) were correct in arguing that intersectoral inequality is a good measure of household income inequality.

The data on income inequality was obtained over a period of a year, from direct communication with the economic statistics divisions of national statistical bureaus, and from secondary sources such as statistical handbooks. The data refers to pre tax household income for circa 1970.

The measure of income inequality is the well known Gini index. The Gini index of income inequality varies from 0 to 1, with 1 meaning total inequality and 0 meaning no inequality at all. The Gini index is an equal interval scale so that a score of .400 represents twice as much inequality as a score of .200.

B. THE INDEPENDENT VARIABLES

1. POLITICAL DEMOCRACY. The degree of political democracy has long since been a major variable in theoretical works on the determinants of income inequality (Kuznets, 1963; Lenski, 1966; Cutright, 1967; etc). It has been argued that elementary Political democracy and, more importantly, an intensification of political democracy through the establishment of such institutions as a labor party, proportional representation, and the greater political participation of the masses gives the many the necessary powers to combine against the few in the former's attempts to redistribute income. To the extent that the common people have state power, they can use it to increase their share of the income through such means as increasing the size of government revenue as a percent of the G.N.P. This can entail the providing of more government jobs, and government subsidized jobs through the practice of government's granting contracts to production and service industries in the private sector. The next result is less unemployment resulting in less inequality. In addition, the common people can encroach on the wealth and income of the affluent through the establishment and intensification of progressive income taxes, inheritance taxes, cash transfer programs, welfare programs, and social security programs.

While all this seems to make a great deal of sense in the world of logic, it is not at all clear that it corresponds to actual reality. The research evidence is very mixed. The findings of Parkin (1971) for about a dozen European nations indicate that the levels of income inequality in the supposedly intensely democratized Scandavian nations (eg. Sweden, Norway, Denmark) are similar to nations lower in political democratization or nations not having experience prolonged rule by a labor party (eg. Austria, France, West Germany). Parkin argues that an effective redistribution of power to the underclass, in terms of effective power to redistribute income to manual workers, occurs only after a transformation of the economic base of society from capitalist system to a communistic system. Parkin's major reason

for this thesis is that the market in capitalism is the chief force in wage determination, even more powerful than human control in a labor party-ruled state. In contrast, communism, eliminates the market, and the economy, including the institutions shaping wage policy, is under direct, complete human control Parkin's evidence suggests that politics should be dropped from income stratification theory involving capitalist samples but it should not be dropped if we extend our analysis to communist nations.

Jackman (1974) implicitly suggests the dropping of the political dimensions from stratification analysis. The addition of his complex index of democratic performance to his regression equations failed to add any explanatory power, However, Jackman's sample did not include any socialist nations. From Parkin's findings we would expect that a significant amount of variance would have been explained through the addition of socialist nations.

On the other hand two other studies demonstrate that politics does explain some of the variance among nations on income inequality. Cutright's Political Representation Index explained 14% of the variance overall and from 20-34% of the variance for sub groups controlling for levels of development. In addition, Rubinson's (1976) recent work found that the distribution of power was an important factor in shaping the degree of income inequality. Indeed, Rubinson's index of state strength (gov't rev. as % GNP) bore a statistically significant relation to levels of overall inequality in all six of his regression equations whereas the level of development (Jackman's major explanatory variable) bore no statistically significant relationship to overall inequality in all six of the regression equations.

These results are rather conflicting but can be explained in terms of the difference in the way in which inequality is measured. selectivity in samples of nations, and the operationalization of the concept of the degree of political inequality. For example Parkin's notion that there is no difference between the most and least democratized capitalistic nation is based on a sample which excludes some highly democratized capitalist nations

with low inequality (eg. Australia, Belgium, and Isreal) also, Parkin's index of income inequality based wage differentials masks differences between nations. Cutright, Jackman, and Rubinson operationalize political democracy very differently. If we operationalize it in a given way we find specific relationships with inequality. Indices emphasizing participation find negative results; ones emphasizing the stability of parliamentary forms of government find positive results.

I propose to partially avoid the above difficulties and contradictions by doing the following: include both communist and capitalist nations in my sample to give political democracy more of a chance to explain the variance, measure political participation, and by using a conceptually accurate unit of distribution, the household as opposed to Jackman's sectoral unit.

The present paper takes issue, for the moment, at the level of logic, with Jackman's finding that politics is irrelevant to the study of income inequality once the level of development is taken into consideration.

Since most of the nation's in the present study have stable parliamentary forms of government ofr the time period analyzed, the intensity of democracy will be measured in terms of political participation. The specific index of political participation is voter turnout. Voter turnout in some nation's is required by law (eg. the Netherlands). This may be taken as a limitation of my index. However, given a high voter turnout means a high turnout among non-affluent persons, we would expect that the results would be relatively more votes cast for relatively egalitarian parties and candidates. I assume that whether or not a working class person is forced to vote, he or she will tend to vote for a working class party.

The change from a sectoral to a household measure of income, may result in a reversal of Jackman's finding that political participation is not significantly related to income inequality.

I anticipate the greater the political participation, the less the income inequality.

2. THE LEVEL OF DEVELOPMENT or size of the surplus. Writers such as Lenski (1966:308), Kooros (1973:101), and Kravis (1962:409) have argued that income inequality should decrease through industrialization. While income inequality will be high and perhaps be on the increase before industrialization, the emergence and intensification of industrial society will reduce income inequality Part of this thesis involves the association of industrialization with political democracy,which is another determinant of income destratification. However, most writers give the level of development separate status as a relatively distinct independent variable reducing inequality. The essential argument is that machine production increases the level of the societal surplus so much that the elite can afford to redistribute income to the common people. However, level of development should be viewed as a necessary but not sufficient determinant of income redistribution; without political pressure from the commonpeople income redistribution will not automatically happen. On the other hand political pressure without a large surplus won't work either.

The research findings on the relationship between level of development and income inequality are somewhat mixed. Kuznets (1963:60-62) longitudinal data covering the period from the late nineteenth century up to about 1950 demonstrate a decrease in inequality as nations develop.

However, available longitudinal data for European nations after 1950 indicates the opposite trend((U.N. (1967)). For the U.S. there was little change in income inequality for the post war decades and the degree of income inequality has increased in the last five years ((Budd, (1970): Stack (1976a)). Apparently when nations reach the highest levels of development, the relationship reverses again.

Research utilizing Cross sectional data gives different results depending on the year of the data and the unit of distribution.

Cutright's cross sectional data using a sectoral income distribution measure of income inequality demonstrated that level of development explained some 27% of the variance in income

inequality and was the strongest of six independent variables entered into his initial regression equation for 44 nations. However, these data were from the 1950's, before the trend towards increasing inequality began in the advanced nations.

Jackman'also used cross sectional data, and a sectoral income distribution measure. His data are more recent than Cutright's; they are mostly from the years 1960-1962. Jackman's Logarithmic index of development explained some 42% of the variance with no other variables added to the equation, with the addition of his other two variables, one at a time, the amount of variance explained was 40% and 44%. The logarithmic index of development was found to be a better predictor of income inequality than either democratic performance (no relationship) and social insurance program experience.

Rubinson's (1976) recent work, however, casts doubts on earlier cross sectional research. Of Rubinson's eight regressions there is not one where the standardized regression coefficient of his logarithmic measure of level of development bears a statistically significant relationship to inequality of incomes. This new development can be explained, in part, in terms of Rubinson's data being based on the distribution of income to households instead of an index where income is distributed to eight selected sectors of the economy. Also, Rubinson's data is even more recent than Jackman's and, therefore, will reflect the recent ironic trend towards increasing inequality in the most advanced nations. This, I expect, would reduce the correlation between inequality and level of development. Indeed, elsewhere, Stack (1976b) I demonstrated, using cross sectional income data based on the household as the unit of distribution for 88 nations, that the relationship between income inequality approximates a sine curve or a curvilinear relationship where the slope of the curve inverses twice. If this is the true nature of the relationship in the long run, traditional regression models may not fit the curve, unless control variables destroy the sine curve relationship.

The present study will measure the level of development in terms of the important notion of surplus. G.N.P. per capita

will be used as the index of surplus. This is a more direct way of measuring surplus size than the indices based on energy consumption in Rubinson and Jackman. While these two measures are highly correlated, they are conceptually different. A nation that is relatively low in development may be high in energy consumption if it is blessed with large energy supplies (e.g. oil) or if it's rate of economic growth is high. In either case, it's surplus would be relatively low.

I anticipate that since the income inequality data are relatively recent, there will be no relationship between income inequality and GNP/capita. However, if we control for level of development and investigate the relatipnship within middle range GNP nations, a relationship should emerge within the group; primarily because middle GNP nations have yet to reach the threshold where income inequality increases despite the highest levels of development.

3. THE RATE OF POPULATION GROWTH. The relative merits of this variable have yet to be tested. Lenski (1966:315) discusses it's relevance as follows:

"the natural tendency of the human race to multiply usually had the effect of offsetting whatever economic gains might otherwise have resulted from technological advance... (today) In societies where these (birth control devices) have been most widely used the rate of population growth has been slowed to the point where real and substantial gains in per capita income have been advanced...which...contributed to the decline in inequality"

Athluwahia (1974) found the rate of population growth to be a significant factor in shaping income distribution for pre industrial societies. However, it's relevance for a broader sample is not yet established.

The rate of population growth is, of course, related to industrialization in that large families are not as functional in industrial as opposed to pre industrial societies. However, for various social and religious reasons there is considerable variation among nations in population growth rates even when we control for level of development. (Stack, 1976c) Hence,this may be an

important source of variation in inequality.

I will use the average rate of population growth in the 1960's as the index of population growth. The index was calculated from data from the World Bank Atlas (1974).

4. EDUCATIONAL LEVEL. A rising level of education results in a balance between the supply and demand for skilled workers. This tends to reduce the potentially high incomes of the skilled group. Kravis (1960:413,415) in his comparison of underdeveloped nations with a low educational level with developed nations with a high educational level, states:

> "The limited supply of educated and trained persons in underdeveloped countries tends to raise the relative renumeration in occupations requiring a high degree of literacy or other skills and hence to increase the dispersion of income....As the diversity of occupations increases with the beginnings of industrialization ...the likelihood of increased inequality is enhanced by the offers of income premiums which the new or expanding industries or occupations make to attract additional supplies of entrepreneurship, capital, and labor."

However, with further industrialization:

> "The distribution of wage and salary income should... become more equal as per capita income grows because of the spread in educational opportunity and the consequent decline in skill differentials."[9]

I anticipate that the higher the education level, the greater the supply of trained manpower and the less the inequality. The level of educational achievement is measured in terms of the medium of years of education completed by the adult (over 25) population. The data are from UNESCO's Statistical Yearbook, 1973.

5. RATE OF INFLATION: Inflation is viewed by several writers as having an impact on income distribution. It is argued that inflation increases inequality by increasing the wages of some groups faster than those of other groups. As Galbraith (1958:264-265:221) states:

> "Inflation by its very nature strikes different individuals and groups with highly discriminatory effects. The most nearly unrelieved victims, apart from those living on pensions, are those who work for the state...their pay scales are highly formalized, and traditionally they have been subject to revision only at lengthy intervals...On the other hand, the incomes of owners and proprietors are automatically accomodated to the upward movement...Those individuals who suffer the most are those who have the least control over their prices or wages and hence the least capacity to protect themselves by increasing their own returns."

I will argue that inflation hurts unorganized blue and white collar workers, state employees, pensioners, welfare recipients, and other relatively powerless groups. As Kohler (1968:239) argues:

> "Inflation involves a redistribution of real income."

This redistribution increases inequality.

The rate of inflation is calculated on the basis of the change in the consumer price index from 1963-1972. The data on changes in the consumer price index are from the United Nations' Statistical Yearbook, 1973.

6. THE RATE OF ECONOMIC GROWTH

Modern technology makes possible a rapid rise in productivity, and hence a rapidly growing G.N.P. A rapidly growing economy makes it possible for the elite to make economic concessions to the common people without suffering any loss in absolute terms. That is, the elite can increase its absolute share of the income by, perhap , billions and at the same time redistribute a few percentage points of the income to the masses. This results in less inequality.

I anticipate that the higher the rate of economic growth, the less the inequality. The time series data on the rate of economic growth corresponds to the same years as the time series data as the rate of population growth and rate of inflation

(early 1960's - 1972). The data are taken from the World Bank Atlas, 1974.

7. THE DEGREE OF TECHNOLOGICAL COMPLEXITY. Lenski argues that the increasing degree of technological complexity created by industrialization requires an ever larger pool of experts to guide decision making. In this process elites progressively find themselves forced to delegate increasing amounts of responsibility to experts. This gives the experts effective bargaining power for increasing their share of income. Lenski (1966:313) contends:

> "In modern industrial societies, technology in particular and culture in general, are far more complex than even in the most advanced agrarian societies. In fact, they are so complex that it is no longer possible for those in positions of high command to begin to understand the work of all those beneath them. In effect, there is a growing ignorance on the part of those in positions of command....Because of many gaps in their knowledge, they are often compelled...to leave matters to the discretion of their subordinates, thus opening the door to encroachments on their prerogatives."

I anticipate that the greater the technological complexity, the less the income inequality. Perhaps the most direct measure of technological complexity would be technical workers as a percentage of the labor force. However, since the relevant data are NOT available, we must find an approximation of this measure. One such substitute measure is per capita energy consumption. Rummel (1969) has shown that per capita energy consumption is a good indicator of technological complexity. The data are from The United Nation's Statistical Yearbook, 1973.

THE ANALYSIS

The analysis will first consider the total set of 32 nations and the nature of the relationship between inequality and the nature of the relationship between inequality and the seven

independent variables in the sample, The second phase of the analysis will control for level of development to see if the amount of variance explained will improve for the group of medium level GNP nations which are below the developmental threshold where inequality increases despite the highest levels of industrialization.

In both phases of the analysis a multiple correlation method of inquiry will be utilized. Here each variable freely competes with the others for their share of the variance. Here the analyst does not specify the order in which the variables are introduced into the regression.

In the third phase of the analysis, to be discussed later, further manipulation of the data are undertaken in accord with the findings in the first and second stages of the analysis, in order to refine the model in process.

THE ANALYSIS OF THE TOTAL SET

The first stage of the analysis explaines the validity of the model for a group of nations at diverse levels of development. Table 2 presents the results of the analysis of these 32 nations. The mean, and standard deviation are given for each variable. Also tabulated is the amount of variance associated with each variable. The index of political participation explains 27% of the variance. The addition of education level adds 16%. The addition of the rate of economic growth accounts for another 7% of the variance. The level of development, technological complexity, and the rate of population growth each account for an additional 3% of the variance but their relationship with the dependent variable is not statistically significant at the .05 level. The addition of the rate of inflation did not add any explanatory power to the equation.

As anticipated the level of development was not a salient factor in explaining the degree of inequality given the nature of the data; that is given the inequality observations on advanced nations are from circa 1970; after the start of the trend towards increasing inequality. Indeed, the zero order product moment correlation was an insignificant -.03.

The rate of inflation had a non-significant zero order correlation of r= .22 with income inequality. The rate of inflation added nothing to the explanatory power of the regression equation. Hence, while inflation may hurt some groups more than others, the net result is the transfer of income from one group to another without any change in the overall degree of inequality. Inflation simply "changes some of the faces" within each income group.

The findings on political participation should be interpreted with a good deal of caution. In inspecting the data it was found that the communist nations all had high, enforced political participation and relatively low degrees of income inequality. Hence, the relationship between political participation and income equality may be spurious. In order to explore this possibility I will now turn to the second stage of the analysis and divide the middle GNP nations into two groups: communist and capitalist. In so doing we will be investigating all the communist nations in the sample since they are all medium GNP nations.[2]

ANALYSIS OF THE MIDDLE GNP STRATUM

The group of middle GNP nations consisted of nations with GNP/capita ranging from $760 - $2,400 in 1972. Table 3 shows the results of our analysis for the group of 14 nations with a capitalist economic base. The rate of population growth emerged as the chief variable accounting for 36% of the variance. While population growth was not a relevant variable for the total set of nations including nations at all levels of development, it is a relevant variable for middle GNP nations. Voter turnout remained a significant predictor of income inequality despite the omission of the communist nations. This variable accounted for 16% of the variance. As predicted, GNP/capita emerged as a relevant variable for this group of nations, explaining another 10% of the variance. Technological complexity also emerged as a significant factor, if we stretch significance to the .10 level due to the small sample size, and explained another 11% of the variance. The rate of

inflation was again a largely irrelevant variable adding only another 2% to the total variance explained. The level of education, while a relevant independent variable for the total set of nations, added almost no explanatory power to the regression equation here. A total of 79% of the variance is explained by the model for middle GNP nations, representing an increase in explanatory power.

The results from the analysis of the middle GNP communist nations are given in Table 3. Due to the sample size (n= 8), only six variables could be entered into the regression analysis. In communist nations there is a very strong realtionship between technological complexity and the level of inequality. 81% of the variation in inequality is linked to variation in technological complexity. As technological complexity increases inequality decreases. Controlling for technological complexity we see that communist nations with high education levels have lowere inequality. The addition of the rate of economic growth explains another 4% of the variance as does the inclusion of the rate of population growth. Political participation does not vary very much among communist nations (the standard deviation is only 3% of the mean), and accounts for only a trivial 1% of the variance with all the other five variables controlled. In all, the model explains 95% of the variance for the communist nations.[3]

That the model worked the best for the nations with a communist economic base may have been due to differences in the mean degree of inequality between communist and free enterprize economic systems. The communist nations had a mean Gini Index of .249 compared to the mean of .456 for the medium GNP free enterprize nations. Furthermore, the standard deviations as a percent of the mean was lower for the communist nations than the capitalist nations (11.2 vs. 23.5%) indicating that the spread of scores for communist nations was, perhaps, distinct from the spread of scores for the free enterprize nations. These differences may mean that the communist nations are operating under conditons of the lowest degree of income inequality that is possible for the functioning of society. If so, the degree of inequality wil be strongly conditioned by one or more factors in the model approachin a

functional prerequisite or law governing the relations between society and inequality. The data suggest that GNP/capita or technological complexity may determine the variation in inequality once inequality is near it's lowest possible level. This adds some support to Jackman's contention that the level of development is an important factor in shaping stratification.

FURTHER ANALYSIS

The finding that communist economic systems are linked to less inequality of incomes than capitalist systems support Parkin's (1971) thesis. The elimination of the private ownership of property reduces or abolishes several important sources (e.g. dividends, rent, interest, and capital gains) of income for upper income groups. Also, communism reduces the importance of the market, or supply and demand forces, in shaping incomes and places wage determination more under the control of centralized agencies of the powerful communist party.[4] One is tempted to enter the type of economic system into the regression equations to see if this variable would replace some of the others as the leading determinant of income equality.

Entering the type of economic system into the regression analysis poses a problem because it is a nominal variable. However, we can approximate the type of economic system with a variable such as the proportion of industry owned publically or the production of public enterprises as a percent of the GNP. Data was not available on either of these variables, but they were available for Revenue of Central government, social security, and public enterprize as a percent of GNP ((Russett (1964)). This is a measure of government involvement and power over the economy in terms of the volume of money the government directly manipulates in the processes of consumption and production. Essentially, this is a neo qualitative variable since the free enterprize nations had an average score of only 30% while the communist nations, by definition, have scores

at the other extreme of the scale.[5] In addition, this variable also distinguishes free enterprize nations with low state involvement from free enterprize nations with relatively high state involvement. I will call this variable the index of the degree of socialism, a euphenism for the degree communism.

Table 4 presents the results for the regression analysis involving the degree of socialism index. The analysis is for 24 nations for which data was available. GNP/capita, and the rate of population growth were found to explain 0% of the variance and had low zero order correlations with inequality and were omitted from the table. The rate of inflation was not entered into the regression since it had been already determined an irrelevant variable.

The Index of the degree of socialism was found to be powerfully related to the degree of inequality. It explained 60% of the variance. Hence, when added to the model, it displaced political participation as the main determinant of income inequality. Controlling for the degree of socialism, the level of education explained another 6% of the variance. In addition the rate of population growth and technological complexity were each linked to 2% of the variance. Controlling for all other factors, political participation accounts for only 1% of the variance.

These findings have rather profound implications. The evidence presented here suggests the two main variables of earlier research, political democracy and the level of development, have nearly no influence on income inequality when one controls for the degree of socialism. However, Alternate indices of political democracy may improve the relationship between income inequality and politics while controlling for socialism. This is an area for further research.

CONCLUSION

Six of the seven original hypotheses were confirmed in one or more sections of the analysis. The hypotheses on rate of inflation was the notable expeption. The variance explained by my model ranged from 59-95%. This is more than that explained by

Jackman's (1974) model (39-44%); this may be due, however, to his utilization of only three independent variables. On the othernand, Cutright's model explained from 64-97% of the variance representing, perhaps, a more superior model, unless one criticizes it's methodological weaknesses such as the validity of measuring personal income on the basis of sectoral income and the utilization of old data.

The most powerful predictor of income inequality in a broad sample of nation's was the index of the degree of socialism. This formerly untested variable was found to be even more important than either level of development or the degree of political democracy in shaping income distribution. Future models of income inequality ought to include this variable.

For a set of moderately developed free enterprize nations, the rate of population growth was found to be a more important determinant than any other variable including political participation and level of development. Future research, then, on nations at this level of development would have much to gain from the analysis of rates of population growth.

Technological complexity was found to explain nearly all the variation within the communist nations. However, this variable was so highly correlated with the level of development that both were equally good predictors of inequality within the communist block. Other than this finding, the level of development was not a leading determinant of income inequality and bore no significant relation to inequality at all for the set of 32 nations as a whole.

Education level bore a significant relationship to the degree of inequality and was the second most important determinant at two places in the analysis.

Political Participation: the index of the degree or intenseness of political democracy, was the most important determinant for the sample of 32 nations. However, it became non significant after the introduction of an eighth variable, the index of socialism, at the end of the analysis.

In general, the present paper suggests several new directions for further research on the determinants of inequality of incomes.

Existing models have failed to incorporate several important variables and have a few methodological problems. While the present study also has it's shortcomings (e.g. smaller sample size), it offers enough evidence to illustrate the incompleteness of existing models.

FOOTNOTES

1. If we use the Kendall Rank Order correlation (Tau) we find similar relationships. Tau for the relation between the Gini and the Jackman index is -.403 (z value -2.36387 sig. at .01 level of sig.) and Tau = .493 (sig. at .002 level) for the relation between Gini index and Cutright's index (z value 2.85926).

2. Medium level GNP nations are defined somewhat arbitrarily as those nations with GNP/capita scores of from 760 to 2,400. My Medium Level GNP nations are the same general group as Cutright's. High GNP/capita nations would include Russett's High Mass Consumption Societies such as the United States and Sweden.

3. For the communist nations technological complexity and GNP/capita were highly related (the zero order Pearson correlation coefficient was .936). Hence, when technological complexity was deleted from the analysis, GNP/capita explained 80% of the variance with economic growth, population growth and education level picking up the balance of the 95% explained. Technological complexity was, in turn, reduced to last place in the order of importance.

4. For a further discussion see Stack (1976) "Income Stratification and Type of Economic System" Paper read at the 1976 Annual Meetings of the American Sociological Association, New York.

5. These data, being taken from circa 1960, do not directly "match up" with the data for the other variables which are from circa 1970 or the time series of 1960-1972. However, given the quasi qualitative nature of the variable and given that none of the capitalist nations became communist nations by 1972, I do not feel that this is a serious problem.

TABLE 1: CORRELATIONS BETWEEN ALTERNATE INDEXES OF INCOME INEQUALITY

Table 1

	G/H	C/S	J/S
G/H[b]	1.000	.718**	-.657*[a]
C/S[c]		1.000	-.767**[a]
J/S[d]			1.000

*Significant at .01 level (F-test)
** Significant at .001 level (F-test)

a. The negative sign of the Pearson's r here indicates a direct relation because Jackman reverses the values of his index of inequality, the Schutz coefficient, so that the higher the score on the Schutz coefficient the greater the degree of material equality. The reverse is true for the author's Gini index and Cutright's Lorenz coefficient.

b. Gini Index of Household Income Inequality

c. Cutright's Lorenz Index of Sectoral Income Inequality

d. Jackman's Schutz Index of Sectoral Income Inequality

TABLE 2: MEANS, STANDARD DEVIATIONS, AND PERCENT OF VARIANCE EXPLAINED BY VARIABLES IN A GIVEN ORDER:

32 Nations

Variable	Mean	Standard Deviation	Percent of Variance
Political Participation	82.5	13.2	27*
Education Level	6.3	2.5	16*
Rate of Economic Growth	4.1	1.9	7*
Level of Development	2,032	1,236	3
Technological Complexity	3,417	2,308	3
Rate of Population Growth	1.3	.9	3
Rate of Inflation	25.2	89.3	0
Total			59

*$p < .05$

TABLE 3: MEANS, STANDARD DEVIATIONS, AND PERCENT OF VARIANCE IN INEQUALITY EXPLAINED BY INDEPENDENT VARIABLES IN A GIVEN ORDER: Medium GNP Nations

Variable	Mean	Standard Deviation	Percent of Variance
Rate of Population Growth	1.6	1.1	36*
Technological Complexity	1,785	866	11**
Political Participation	74.4	10.4	16*
Rate of Economic Growth	4.0	2.4	3
Level of Development	1,275	532	10*
Rate of Inflation	52.2	132	2
Education Level	5.1	1.9	1
Total			79

*$p < .05$
**$p < .10$

TABLE 4: MEANS, STANDARD DEVIATIONS, AND PERCENT OF VARIANCE IN INEQUALITY EXPLAINED BY INDEPENDENT VARIABLES IN A GIVEN ORDER:

Communist Nations

Variable	Mean	Standard Deviation	Percent of Variance
Technological Complexity	3,789	1,605	81*
Education Level	.69	.43	4
Rate of Economic Growth	4.9	1.6	4
Rate of Population Growth	7.0	2.6	4
Level of Development	1,483	504	1
Political Participation	97.8	3.1	1
Total			95

*$p < .05$

TABLE 5: MEANS, STANDARD DEVIATIONS, AND PERCENT OF VARIANCE EXPLAINED BY VARIABLES IN A GIVEN ORDER:

24 Nations

Variable	Mean	Standard Deviation	Percent of Variance
Degree of Socialism Index	56.108	32.1	60*
Education Level	6.57	2.6	6*
Rate of Population Growth	.95	.67	2
Level of Development	2,264	1,303	0
Technological Complexity	3,995	2,356	2
Rate of Economic Growth	4.38	1.74	0
Political Participation	85.2	13.0	1
Total			71

*$p < .05$

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